

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) An injection molding method comprising:

injecting a molten resin material into a cavity defined by a fixed die and a movable die via a runner provided in the fixed die and a gate provided in the fixed die,

wherein when the molten resin material is being charged into the cavity through the resin reservoir from the gate, a cut punch, which is provided in the side of the movable die that confronts the gate through a resin reservoir formed by recessing the fixed die toward the gate and which is movably provided so that the cut punch is inserted into the resin reservoir so as to be in slidable contact with the resin reservoir, has a distal end thereof extending in a moving direction thereof that is toward the resin reservoir of the cut punch, and the distal end is located between the resin reservoir and the cavity at such a position as to open a communicating portion that allows the resin reservoir and the cavity to communicate with each other so that the molten resin material is introduced into the cavity via the resin reservoir;

wherein when an inner portion of the resin material that is present in the resin reservoir is still molten and a portion of the resin material thereof that is in direct contact with the cooled dies is gradually solidified after the molten resin material has been charged into the cavity and the resin reservoir, the cut punch moves toward the gate so that the cut punch is inserted into the resin reservoir, whereby the cut punch not only closes the communicating portion while forcibly

pushing the still molten resin material present in the resin reservoir back into the gate, but also cuts the resin material at the communicating portion so that a resin molded product formed in the cavity is separated from a resin solidified portion formed in the resin reservoir, and

wherein an undercut portion provided at a periphery of the distal end of the cut punch, the undercut portion disposed closer to an edge portion of the distal end than a center portion of the distal end, retains the resin solidified portion in the resin reservoir.

2. (Original) An injection molding method according to claim 1, wherein a plurality of resin molded products are molded by a plurality of the cavities, the resin reservoirs and the cut punches.

3. (Original) An injection molding method according to claim 1 or 2, wherein that the runner is a hot runner.

4. (Previously presented) An injection molding method according to claim 3, wherein the hot runner has a valve gate structure, in which a valve gate is closed to close the gate after the cut punch has moved.

5. (Previously presented) An injection molding method according to claim 1, wherein a resin molded product having an opening is molded by a resin reservoir and the cut punch inserted

into the resin reservoir, the resin reservoir being provided so as to correspond to a shape of the opening of the resin molded product.

6. (Currently Amended) An injection mold comprising:

a fixed die and a movable die which form a cavity into which a molten resin material is injected via both a runner and a gate provided in the fixed die, the gate being connected to the cavity through a resin reservoir formed by recessing the fixed die toward the gate; and

a cut punch provided on the side of the movable die that confronts the gate through the resin reservoir, the cut punch being movable so that the cut punch can be inserted into the resin reservoir so as to be in slidable contact with the resin reservoir,

wherein when the molten resin material is being charged into the cavity, a distal end of the cut punch which extends in a moving direction of the cut punch that is toward the resin reservoir is located between the resin reservoir and the cavity at such a position as to open a communicating portion that allows the resin reservoir and the cavity to communicate with each other so that the molten resin material is introduced into the cavity via the resin reservoir;

wherein when an inner portion of the resin material that is present in the resin reservoir is still molten and a portion of the resin material thereof that is in direct contact with the cooled dies is gradually solidified after the molten resin material has been charged into the cavity and the resin reservoir, the cut punch moves toward the gate so that the cut punch is inserted into the resin reservoir, whereby the cut punch not only closes the communicating portion while forcibly pushing the still molten resin material present in the resin reservoir back into the gate, but also

cuts the resin material at the communicating portion so that a resin molded product formed in the cavity is separated from a resin solidified portion formed in the resin reservoir,

wherein the runner contacts the resin reservoir, and the gate is disposed at the point where the runner contacts the resin reservoir, such that the gate does not protrude into the resin reservoir, and

wherein an undercut portion is provided at a periphery of the distal end of the cut punch, disposed closer to an edge portion of the distal end than a center portion of the distal end, the undercut portion serving to hold the resin solidified portion formed in the resin reservoir at the time of mold opening.

7. (Original) An injection mold according to claim 6, comprising plural pairs of the cavities, the resin reservoirs and the cut punches.

8. (Original) An injection mold according to claim 6 or 7, wherein the runner is a hot runner.

9. (Original) An injection mold according to claim 8, wherein the hot runner has a valve gate structure.

10. (Previously presented) An injection mold according to claim 6, wherein the injection mold is used to mold a resin molded product having an opening and has a resin reservoir and a cut punch inserted into the resin reservoir, the resin reservoir and the cut punch being provided so as to correspond to the opening of the resin molded product.

11. (previously presented) An injection mold comprising:
a fixed die and a movable die which form a cavity into which a molten resin material is injected via both a runner and a gate provided in the fixed die, the gate being connected to the cavity through a resin reservoir formed by recessing the fixed die toward the gate; and

a cut punch provided on the side of the movable die that confronts the gate through the resin reservoir, the cut punch being movable so that the cut punch can be inserted into the resin reservoir so as to be in slidable contact with the resin reservoir,

wherein when the molten resin material is being charged into the cavity, a distal end of the cut punch which extends in a moving direction of the cut punch that is toward the resin reservoir is located between the resin reservoir and the cavity at such a position as to open a communicating portion that allows the resin reservoir and the cavity to communicate with each other so that the molten resin material is introduced into the cavity via the resin reservoir;

wherein when an inner portion of the resin material that is present in the resin reservoir is still molten and a portion of the resin material thereof that is in direct contact with the cooled dies is gradually solidified after the molten resin material has been charged into the cavity and the resin reservoir, the cut punch moves toward the gate so that the cut punch is inserted into the

resin reservoir, whereby the cut punch not only closes the communicating portion while forcibly pushing the still molten resin material present in the resin reservoir back into the gate, but also cuts the resin material at the communicating portion so that a resin molded product formed in the cavity is separated from a resin solidified portion formed in the resin reservoir,

wherein the runner contacts the resin reservoir, and the gate is disposed at the point where the runner contacts the resin reservoir, such that the gate does not protrude into the resin reservoir, and

wherein a depth as viewed in a moving direction of the cut punch in the resin reservoir is 1.5 to 10 times an opening distance of the communicating portion.

12. (Canceled)

13. (Currently Amended) An injection molding method comprising:

injecting molten resin material via a runner to flow from an injection nozzle located in a fixed die, through a gate and into a resin reservoir, and to further flow into a cavity via a communication portion, the communication portion being located between the resin reservoir and the cavity; and

forming a resin molded product in the cavity by closing the communication portion so that the resin molded product formed in the cavity is separated from a resin solidified portion formed in the resin reservoir and

retaining the resin solidified portion in an undercut portion formed on a periphery of a distal end of a cut punch, the undercut portion disposed closer to an edge portion of the distal end than a center portion of the distal end,

wherein, the communication portion is closed by advancing the cut punch from a movable die portion through the resin reservoir towards the gate portion, the cut punch provided in the side of the movable die that confronts the gate and being in slidable contact with the resin reservoir, and

wherein, the closing is performed when an inner portion of the resin material present in the resin reservoir is still molten and a portion of the resin material in both the resin reservoir and the cavity, which are in contact with the fixed and movable die, is partially solidified, the cut punch pushing the molten inner portion still present in the resin reservoir back into the gate.

14.(Original) The injection molding method according to claim 13, further comprising removing the resin solidified portion attached to the cut punch using a pushing device, the pushing device being slidably mounted inside the cut punch, so as to be independent of the cut punch, wherein

the resin solidified portion is formed from the resin remaining in the resin reservoir after the communication portion has been closed.

15. (Currently Amended) An injection mold comprising:

a fixed die and a movable die which form a cavity into which a molten resin material is injected via both a runner and a gate provided in the fixed die, the gate being connected to the cavity through a resin reservoir formed by recessing the fixed die toward the gate;

a cut punch provided on the side of the movable die that confronts the gate through the resin reservoir, the cut punch being movable so that the cut punch is operative to be inserted into the resin reservoir so as to be in slidable contact with the resin reservoir; and

a communicating portion, formed between the resin reservoir and the cavity when the cut punch is not in slidable contact with the resin reservoir, the communication portion allowing the resin reservoir and the cavity to communicate with each other so that the molten resin material is introduced into the cavity via the resin reservoir,

wherein a molded resin product is formed when the cut punch device moves through the resin reservoir towards the gate to close the communication portion, which cuts the resin material at the communication portion so that the resin molded product formed in the cavity is separated from a resin solidified portion formed in the resin reservoir,

wherein the cut punch moves at a time when an inner portion of the resin material that is present in the resin reservoir is still molten and a portion of the resin material thereof that is in direct contact with cooled dies is gradually solidified after the molten resin material has been charged into the cavity and resin reservoir and

wherein an undercut portion is provided at a periphery of the distal end of the cut punch, disposed closer to an edge portion of the distal end than a center portion of the distal end, the undercut portion serving to hold the resin solidified portion formed in the resin reservoir at the time of mold opening.

16. (Canceled)

17. (Previously Presented): The injection mold of claim 15, further comprising a pushing device for removing the resin solidified portion which is attached to the distal ends of the cut punch, the pushing device being slidably mounted inside the cut punch, so as to be independent of the cut punch.

18. (Currently Amended) An injection mold comprising:

a fixed die and a movable die which form a cavity into which a molten resin material is injected via both a runner and a gate provided in the fixed die, the gate being connected to the cavity through a resin reservoir formed by recessing the fixed die toward the gate; and

a cut punch provided on the side of the movable die that confronts the gate through the resin reservoir, the cut punch being movable so that the cut punch can be inserted into the resin reservoir so as to be in slidable contact with the resin reservoir and having a distal end which extends in a moving direction of the cut punch that is toward the resin reservoir, the distal end located between the resin reservoir and the cavity at such a position as to open a communicating

portion that allows the resin reservoir and the cavity to communicate with each other so that the molten resin material is introduced into the cavity via the resin reservoir; and

means for driving the cut punch when an inner portion of the resin material that is present in the resin reservoir is still molten and a portion of the resin material thereof that is in direct contact with the cooled dies is gradually solidified after the molten resin material has been charged into the cavity and the resin reservoir,

wherein the cut punch is driven toward the gate so that the cut punch is inserted into the resin reservoir, whereby the cut punch not only closes the communicating portion while forcibly pushing the still molten resin material present in the resin reservoir back into the gate, but also cuts the resin material at the communicating portion so that a resin molded product formed in the cavity is separated from a resin solidified portion formed in the resin reservoir, and

wherein an undercut portion is provided at a periphery of the distal end of the cut punch, disposed closer to an edge portion of the distal end than a center portion of the distal end, the undercut portion serving to hold the resin solidified portion formed in the resin reservoir at the time of mold opening.